

**Original research article****Outcome in late onset IUGR babies, associated with risk factors**

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**Abstract**

Despite remarkable differences in the severity of the fetal disease, early- and late-onset FGRs are both associated with poor long-term outcome from neurodevelopmental, cardiovascular and metabolic standpoints. This supports the notion that regardless of the severity, chronic exposure to adverse intrauterine environment is critical to determine adverse fetal programming. Women were categorized into high risk and low risk pregnancies and were followed up till delivery and fetal outcome were noted. Fetal arterial blood PH were noted and correlated with the fetal outcome. In the present study, out of 78 high risk cases, there were total 21 cases of late onset IUGR. There were 3 cases of IUGR associated with preeclampsia, mean POG at birth was 36 weeks, among them 2 had vaginal delivery and 1 underwent LSCS. Two babies had normal CPR and one baby had abnormal CPR. Two babies had abnormal ABG. Birth weights were less than 2.5kg. Mean duration of NICU stay was 6.6 days. No babies were ventilated.

**Keywords:** IUGR babies, fetal arterial blood PH, LSCS

**Introduction**

Late-onset FGR represents 70–80% of FGR. A first distinction with early-onset forms is that the association with late PE is low, roughly 10%. The degree of placental disease is mild, thus UA Doppler is normal in virtually all cases <sup>[1]</sup>. Despite normal UA PI Doppler, there is a high association with abnormal CPR values. In addition, advanced brain vasodilatation suggesting chronic hypoxia, as reflected by an MCA PI <p5, may occur in 25% of late FGR. Advanced signs of fetal deterioration with changes in the DV are virtually never observed. Thus, the cascade of sequential fetal deterioration described above does not occur in late FGR. Despite a more benign nature as compared with early FGR, there is a risk of acute fetal deterioration before labor, as suggested by the high contribution to late-pregnancy mortality, and a high association with intrapartum fetal distress and neonatal acidosis <sup>[2]</sup>. Thus, late FGR lacks a „natural history“ and may undergo rapid deterioration leading to severe injury or death without observable late-stage signs as in early FGR. This might be explained by a combination of causes, which could include the very low tolerance of term fetuses to hypoxia in comparison with preterm, the more frequent presence of uterine contractions in a term pregnancy, and some instances of rapid placental function failure. Contrary to early FGR, late FGR should not represent a management challenge once the diagnosis is established. However, low diagnostic rates still influence that (undiagnosed) FGR contributes to a large share of late pregnancy stillbirths <sup>[3,4]</sup>.

Despite remarkable differences in the severity of the fetal disease, early- and late-onset FGRs are both associated with poor long-term outcome from neurodevelopmental, cardiovascular and metabolic standpoints <sup>[5]</sup>. This supports the notion that regardless of the severity, chronic exposure to adverse intrauterine environment is critical to determine adverse fetal programming. Additionally, it is likely that different fetal maturational stages determine different adaptive programming responses <sup>[6]</sup>. As far as evidence suggests, early and late FGRs are both caused by placental disease, but it is unknown whether they are associated with the same type of placental disease. Placental insufficiency in early-onset FGR is associated with histological signs of abnormal early implantation. It is unclear whether late FGR is a mild form of abnormal placental implantation at early pregnancy or a superimposed placental damage occurring during the second half of the pregnancy. Furthermore, there is evidence supporting that

placental disease in late onset FGR might develop late in pregnancy, as suggested by a proportion of these patients developing abnormal UtA Doppler in the third trimester, after previously normal values [7, 8].

### Methodology

#### Inclusion criteria

Women aged 18-40 years, with singleton pregnancy and period of gestation between 30 to 34 weeks who are willing to take part in the study.

#### Exclusion Criteria

Pregnant women with multiple gestation.

**Study Design:** Prospective Cohort Study.

The study group will comprise all pregnant women at 30-34 weeks, who fulfill the inclusion criteria, coming for antenatal screening, to the Obstetrics out-patient department of Hospital after taking written and informed consent. These women were evaluated with ultrasound Doppler study with other routine investigations and CPR were calculated. Women were categorized into high risk and low risk pregnancies and were followed up till delivery and fetal outcome were noted. Fetal arterial blood PH were noted and correlated with the fetal outcome.

#### Sample size

A study carried out on "Umbilical and fetal middle cerebral artery Doppler at 30-34 weeks" gestation in the prediction of adverse perinatal outcome" has revealed a significant association between log<sub>10</sub> MoM CPR and birth weight Z score  $r=0.131$  ( $p < .001$ ). Based on the above findings of the study, with a power of 80%, and  $\alpha$  error of 5%, it has been estimated that 351 pregnant women, need to be included in the study.

#### Statistical Analysis

Association of categorical variables were performed by chi-square test or Fisher's exact test. The difference in the mean values of the quantitative variables such as CPR ratio between the different groups (low versus high risk) pregnant women were tested for statistical significance by Mann-Whitney U-test or student's t test. The relationship between the CPR and birth weight Z score were studied by estimating pearsons correlation co-efficient and regression equation. Independent predictors associated with adverse perinatal outcomes were studied by employing logistic regression analysis. ROC curve were applied to arrive at the cut off ratio.

### Results

**Table 1:** Period of prolongation of pregnancy after 30-34 weeks period of gestation till delivery

	N	%
0 days	5	1.25%
<1 week	2	0.5%
1 -2 weeks	16	4%
2+1- 4 weeks	114	28.5%
4 +1- 6 weeks	251	62.75%
6+1 – 8 weeks	12	3%
	400	100%

In the present study, period of prolongation of pregnancy was calculated from the time when Doppler studies were conducted that is between 30-34 weeks period of gestation to till the delivery.

Hence in the present study, in 62.75% of cases pregnancy was prolonged for 4weeks +1 day to 6 weeks, in 28.5% of cases prolonged for 2weeks +1day to 4 weeks, 4% prolonged for 1 - 2 weeks. 3% prolonged for 6-8 weeks, 1.25% of cases, pregnancy could not be prolonged, women delivered on the same day, Doppler's were conducted and in 0.5% pregnancy could be prolonged for < 1 week.

**Table 2:** Birth weight

Birth weight	N	%
<1.5 kg	12	3%
1.5 – 2 kg	21	5.25%
2.1 – 2.5kg	46	11.5%
– 3 kg	195	48.75%
>3 kg	126	31.5%
	400	100%

In the present study, birth weight of 48.75% (195) were between 2.6 to 3kg, 31.5% (126) had birth weight more than 3 kg, 11.5% (46) had between 2.1- 2.5 kg, 5.25% (21) had between 1.5 to 2 kg and 3 (12) of them had birth weight of <1.5 kg.

**Table 3:** ABG at birth (PH)

	N	%
Normal	366	91.5%
Abnormal	34	8.5%
	400	100%

In the present study, 91.5% of babies had normal ph at birth, and 8.5% of babies had abnormal ph at birth.

**Table 4:** Outcome in late onset iugr babies, associated with risk factors

risks associated	Pog at birth (mean)	Vaginal	Lscs	CPR normal/ abnormal	ABG normal/ abnormal	Birth weight <2.5kg/> 2.5kg	NICU stay (duration in days) (mean)	Ventilation (Yes/No)
Preeclampsia [n=3]	36	2	1	2/1	1/2	3/0	3,13,4 (6.6)	0/3
Gestational hypertension (PIH) (n=5)	36	3	2	5/0	3/2	3/2	7,12 (9.5)	0/5
GDM + Preeclampsia/ PIH (n=13)	37+3	11	2	11/2	10/3	3/10	6,35,0,5,5 (11.6)	2/11

In the present study, out of 78 high risk cases, there were total 21 cases of late onset IUGR. There were 3 cases of IUGR associated with preeclampsia, mean POG at birth was 36 weeks, among them 2 had vaginal delivery and 1 underwent LSCS. Two babies had normal CPR and one baby had abnormal CPR. Two babies had abnormal ABG. Birth weights were less than 2.5kg. Mean duration of NICU stay was 6.6 days. No babies were ventilated.

There were 5 cases, with gestational hypertension, mean POG at birth was 36 weeks. 3 women delivered virginally and 2 underwent LSCS. All the babies had normal CPR. 2 babies had abnormal ABG. Those 2 babies were shifted to NICU for observation with mean duration of stay was 9.5 days. No babies were on mechanical ventilation.

There were 13 cases that had gestational hypertension and Gestational diabetes mellitus, 11 had vaginal delivery, and two underwent LSCS. Two babies had abnormal CPR. Three had abnormal ABG. 4 were admitted in NICU with mean duration of stay was 11.6 days. 2 babies were on ventilation.

In low risk cases, there were no babies with IUGR, there were 2 babies with SGA, out of which 1 delivered vaginally, with birth weight of 2.4 kg, and other underwent LSCS in view of scar dehiscence with birth weight of 2.2 kg and was shifted to NICU and was on ventilation(CPAP) 2

**Out of total number of NICU admission**

**GDM:** 10

**Gestational hypertension:** 6

**Preeclampsia:** 11

**Severe preeclampsia:** 4

**Discussion**

In the present study, in 62.75% (251) of cases pregnancy was prolonged for 4weeks +1 day to 6 weeks, in 28.5% (114) of cases prolonged for 2weeks +1day to 4 weeks, 4% (16) prolonged for 1 -2 weeks. 3%(12) of cases prolonged for 6 – 8 weeks, 1.25% (5) of cases, pregnancy could not be prolonged, women delivered on the same day, Doppler’s were conducted and in 0.5% (2) pregnancy could be

prolonged for < 1 week. The cases in which pregnancy were prolonged beyond 4 weeks, were closely followed up with NST, AFI, diastolic flow and Ductus Venosus Doppler, and we were able to prolong the pregnancy and had a better fetal outcome with reduced the duration of NICU stay. In the present study, birth weight of 48.75% (195) were between 2.6 to 3kg, 31.5% (126) had birth weight more than 3 kg, 11.5% (46) had between 2.1- 2.5 kg, 5.25% (21) had between 1.5 to 2 kg and 3 (12) of them had birth weight of <1.5 kg.<sup>9</sup>

**Table 5:** Birth Weight

Birth weight (kg)	M. PE'REZ-CRUZ <i>et al</i> <sup>[10]</sup>	Present study
Normal Doppler	3.35kg+/- 374gms	2.82kg
FGR (Abnormal Doppler)	2.14kg	1.94kg

There were nearly 17% of birth weights being less than 2.5 kgs (FGR)

Mean birth weight of babies in the present study, among the normal Doppler was 2.82kg, and this was in comparison to study done by M. PE'REZ-CRUZ *et al*, where mean birth weight was 3.35kg.

Mean birth weight of babies in the present study, among the FGR babies, was 1.94kg, and this was in comparison to study done by M. PE'REZ-CRUZ *et al*, where mean birth weight was 2.14 kg.

In the present study, the difference between the mean birth weight of FGR babies and normal babies was statistically significant.

In the present study, 45% (180) of women belonged to POG of 36-37+6 weeks, 35.25% (141) of women belonged to > 38 weeks, 11.5% (46) of women belonged to 34 to 35+6 weeks, 5.25% (21) of women belonged to 32 – 33+6 weeks and 3% (12) of women belonged to 30 – 31+6 weeks period of gestation.

**Table 6:** Period of gestation at birth

POG at birth (mean)	M. PE'REZ-CRUZ <i>et al</i> <sup>[10]</sup>	Present study
Normal Doppler	38 weeks	38 weeks
FGR (Abnormal Doppler)	35 weeks	35 weeks

In the present study, the mean POG at birth was 38 weeks (266 days) for babies normal Doppler and 35 weeks (245 days) for babies with FGR. This was in comparison with study done by M. PE'REZ-CRUZ *et al*. Only a small percent of (8.25%) were early preterm and 11.5% were late preterm

### Conclusion

- Late onset FGR babies do not adapt well to the sudden onset of Hypoxia unlike the early onset fetuses, who adapt well to the hypoxia.
- There is no contraindication for vaginal delivery in low risk cases with abnormal Doppler.

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